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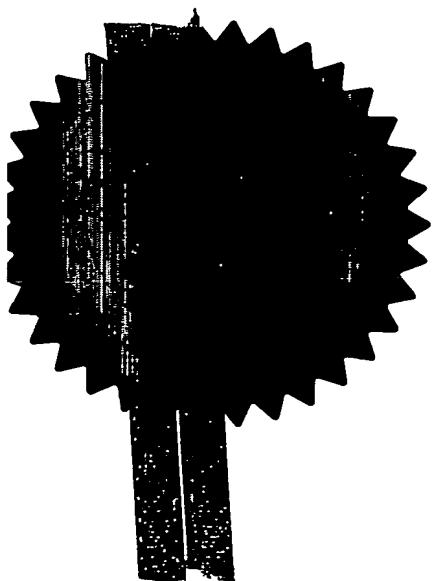
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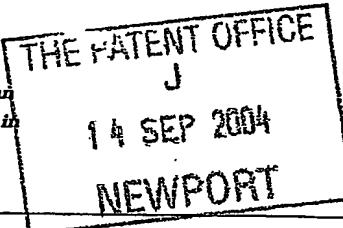
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1. Your reference

GMD/P501978

2. Patent application number

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0420468.1

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*Carglass Luxembourg Sarl - Zug Branch
Gotthardstrasse 20
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SWITZERLANDPatents ADP number *(if you know it)*8180770002
Switzerland

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

Vehicle Glazing Panel Cut Out

5. Name of your agent *(if you have one)*

URQUHART-DYKES & LORD LLP

*"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)*Three Trinity Court
21-27 Newport Road
CARDIFF
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Country

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Description	11
Claim(s)	5
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Request for substantive examination (Patents Form 10/77)	-
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I/We request the grant of a patent on the basis of this application.

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URQUHART-DYKES & LORD LLP 14 September 2004

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr G M Davies

029 2048 7993

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Vehicle Glazing Panel Cut Out

The present invention relates to a vehicle glazing panel cut out technique.

5

vehicle glazing panels such as vehicle windscreens (windshields) are typically bonded in supporting frames by adhesive bonding material such as polyurethane, applied in a continuous bead about the periphery of the glazing panel and frame.

10

Wire cutting techniques have been previously proposed and used to effect glazing panel removal (for replacement or otherwise). Exemplary techniques are disclosed in for example US Patent 15 6616800, German Patent 4012207 and PCT Publications WO86/07017 and WO98/58779.

An improved technique has now been devised.

20

According to a first aspect, the present invention provides a method of cut out of a vehicle glazing panel bonded in a frame by means of interposed bonding material, the method comprising:

25

setting a wire winder unit on the windscreens, the winder unit including a plurality of winder spools and at least one wire wrap around guide element positioned proximate a corner of the glazing panel;

30

setting a wire guide arrangement on the windscreens spaced from the wire winder unit, the wire guide arrangement including respective wire wrap around guide elements positioned proximate respective corners of the glazing panel;

looping a cutting wire about the periphery of the glazing panel and inserting first and second ends of the wire through the bonding material;

5 winding the wire from opposed ends by means of the winder spools.

It is preferred that the set position of the wire winder unit and the wire guide arrangement relative to the glazing panel 10 remains substantially fixed throughout the cut out procedure. There is therefore no requirement to necessarily reposition the apparatus during the procedure.

15 Beneficially, the winder spools are spaced and the opposed end portions of the cutting wire are wound around respective spools, such that a wire crossover portion is created adjacent the winder spools.

20 The wire winder unit and wire guide arrangement are preferably set on the glazing panel internally of the vehicle, the cutting wire desirably being looped around the periphery of the glazing panel externally of the vehicle.

25 It is preferred that the one or more wrap around guide elements comprise rotatably mounted guide wheels.

In a preferred embodiment, the wire guide arrangement includes a mounting arrangement comprising one or more suction mounts.

30 In a preferred embodiment, the wire winder unit includes a mounting arrangement comprising one or more suction mounts.

35 Beneficially, in set up, the cutting wire is inserted to pass through the bonding material at a position proximate a corner of the glazing panel, more preferably at a position to the same

side of the glazing panel as the wire winder unit, more preferably still, at a position substantially directly below the wire winder unit.

5 It is preferred that the wire wrap around guide elements of the guide arrangement are positioned to the same side of the glazing panel.

10 In a preferred technique, at set up, a longer length of cutting wire extends around the wrap around guide elements of the guide arrangement and is wound on a first winding spool of the winder unit, a shorter length of cutting wire extending around a wrap around guide element of the winder unit and being wound on a second winder spool of the winder unit. The wire beneficially 15 defines a cross over point proximate the winder spools. It is preferred that, the spool connected to the shorter length of wire is first wound in to effect a first cut phase; the spool connected to the longer wire length being subsequently wound in.

20 Beneficially, during the procedure a ratchet of one of the spools is released facilitating slackening or more preferably unwinding (reverse winding) of a previously wound portion of the cutting wire.

25 The guide arrangement preferably includes a mount and a pair of positioning limbs extending from the mount at an apex defined by the proximal ends of the limbs, each said limb carrying at its distal end a respective wrap around guide element for the 30 cutting wire. Desirably, the wrap around guide elements comprise guide wheels rotatably mounted to the respective limbs. Beneficially, the limbs are pivotally connected to the mount such that the angle between the limbs can be varied. The limbs are preferably pivotally connected to the mount such that 35 the limbs can pivot in two mutually perpendicular axes. In a

preferred embodiment, the pivotal mount comprises a ball and socket type connection. It is preferred that the apex mount comprises a suction mount.

5 It is preferred that one or both (preferably both) limbs is provided with a further mount intermediate the opposed ends of the limb. Desirably, the further mount comprises a suction mount. The further mount is preferably adjustable to be secured at various positions along the length of the limb.

10 Alternatively or additionally, the further mount is adjustable with respect to its angular orientation about the longitudinal axis of the limb. It is preferred that the further mount is adjustable to the position of the mount below the limb.

15 The winder unit preferably comprises:

mounting means for mounting the unit;

20 first and second winder spools for winding cutting wire; and,

at least one wire wrap around guide element positioned away from the mounting means.

25 Beneficially, the wrap around guide element comprises a guide wheel rotatably mounted with respect to the unit. Desirably, the mounting means comprises one or more (preferably a pair of) suction mounts.

30 According to a further aspect, the present invention provides apparatus for use in cutting out a vehicle glazing panel using cutting wire, the apparatus comprising:

a winder unit comprising:

mounting means for mounting the winder unit;

first and second winder spools for winding the cutting wire; and,

5

at least one wire wrap around guide element positioned away from the mounting means; and,

10 a guide arrangement including mounting means for mounting the guide arrangement and a pair of positioning limbs extending from the mount at an apex defined by the proximal ends of the limbs, each said limb carrying at its distal end a respective wrap around guide element for the cutting wire.

15

Preferred features of the apparatus are as described and exemplified herein.

20 The invention will now be further described in a specific embodiment by way of example only and with reference to the accompanying drawings, in which;

25 Figure 1 is a schematic plan view of a winder unit of an exemplary cut out system in accordance with the invention;

Figure 2 is a schematic representation of a guide arrangement for use with a winder unit in accordance with an exemplary cut out system of the invention;

30 Figures 3a and 3b are detailed views of a parts of the guide arrangement of figure 2; and,

Figures 4 to 8 are schematic representations in sequence of a cut out technique in accordance with the invention.

35

Referring to the drawings, and initially to figures 1 to 3, there is shown a cut out system particularly for use in cut out of bonded vehicle glazing panels such as windscreens. The cut out system comprises a winder unit 1 and a guide arrangement 2. 5 A flexible cutting wire is looped around the outside of a windscreens glazing panel to lie peripherally adjacent the bonding bead (typically a polyurethane bonding bead) which is sandwiched between the glazing panel and the support frame of the vehicle. Opposed ends of the cutting wire are fed through 10 a pierced channel made through the bonding bead as will be described in detail and the free ends are then each wound around a separate winder spool 4, 5 of the winder unit. As will be described the long end of the wire is passed around the guide pulley wheels 6, 7 of the guide arrangement 2 and a first 15 one 8 of the guide pulleys of the winder unit 1; the shorter end of the cutting wire being passed around the other of the guide pulleys 9 of the winder unit.

The winder unit 1 comprises a pair of releasable suction cup 20 mounts 10, 11 enabling the winder unit to be releasably secured to the windscreens. The suction cup mounts comprise a rigid plastics cup 12 and underlaying flexible rubber skirt membrane 13. Respective actuation/release levers 14 enable consistent suction to be applied and released. Such suction mounts are 25 commonly employed in windscreens replacement and repair technology. The suction cup mounts 10, 11 are pivotably/tiltably mounted to the support bracket 15 of the winder unit to ensure that both mounts 10, 11 can locate in good engagement with the windscreens despite the curvature of 30 the windscreens. The main body of the support bracket 15 carries a pair of underslung winding spools 4, 5 in side by side relationship. The spools are connected to axial winding shafts which are supported in bearings 16, 17 provided on the winder unit. The spools 4, 5 are driven axially rotationally 35 either manually via a hand winder or by means of a mechanical

actuator such as a motorised winding or winching tool. Drive bosses 18 are provided with female sockets 19 (square bores) for receiving the male driving tool. Positioned outwardly of the winding spools are respective wire guide pulley wheels 8, 9 of low friction plastics material. The pulley wheels are mounted to be rotatable about respective rotational axes. The guide pulleys rotate as the cutting wire is drawn tangentially across the pulleys as will be described. The winder spools 4, 5 are held to rotate in one direction only (each in opposite senses) by respective ratchet mechanisms. Each mechanism includes ratchet override permitting prior tightened wire to be slackened, or unwound (reverse wound).

The guide arrangement 2 comprises an apex suction cup mount 20 from which extends angularly spaced arms 21, 22 each of which carry at their respective distal ends a respective distal guide pulley wheel 6, 7. The distal guide pulley wheels 6, 7 are manufactured of low friction plastics material and mounted rotatably to the distal ends of the arms on respective support bosses 23, 24. Each pulley wheel includes a peripheral channel 25 within which the cutting wire locates. Each arm 21, 22 is provided with a respective distal suction cup mount 26, 27. The distal suction cup mounts 26, 27 are slidable along the respective arms 21, 22 and provided with securing clamps 28 actuated by a turn handle 29 to secure the respective distal suction cup mount at the desired position along the length of the respective arm. The securing clamps also permit angular rotation of the distal suction cups about the circumferential outer surface of the rod (arrow A in Figures 2 and -3a) comprising the respective arm. The depth of the suction cup mounts below the respective arms is also adjustable (arrow B in Figures 2 and 3a) by means of the suction cup mount including an upstanding post 31 about which the clamp 28 relatively slides and secures by means of a grub screw 30. The suction cup mount 26, 27 can also pivot about the upstanding support

post 31 (arrow C in Figure 3a). The proximal ends of the arms are mounted to the apex suction mount 20 by means of respective spherical surface profile bosses 35 about which part spherical annular bushed bearings 37 are mounted. These mountings permit 5 the angle between the arms to be adjusted (arrow D in Figure 2) to suit the configuration and size of the subject windscreen. Also the angle between the arm axis and the surface of the windscreen can be varied to suit the curvature of the windscreen (arrow E in Figure 3b). The arrangement of the -10 guide system as described ensures that the distal guide pulley wheels 6, 7 can be accurately positioned in close proximity to the corners of the windscreen, and that the distal suction cup mounts 28 can be conveniently located to provide secure support proximate the distal pulley wheels 6, 7. Because the arms 21, 15 22 are both mounted to the apex suction cup mount 20 the whole guide arrangement is securely held to the windscreen the arms taking up the considerable bracing forces exerted by the cutting wire in tension. In view of the large forces generated in the wire during winding, it is important that the guide 20 arrangement is sufficiently securely held secured to the windscreen and of sufficient structural integrity.

Referring to figures 4 to 8 in which operation of the system to cut out an exemplary body such as a vehicle windscreen is 25 described. The present technique enables the positioning of the system apparatus to achieve cut out with little or no subsequent re-positioning of the system apparatus. The set up is therefore an important phase of the technique.

30 The guide arrangement 2 is initially attached via the suction cup mounts 20, 28 to the inside of the windscreen as shown in figure 4. The aim is to position the pulley wheels 6, 7 as far into the upper and lower corners of one side of the windscreen as possible, with as little separation between the 35 glass and the pulley wheel as possible. Usually the guide

arrangement pulley wheels 6, 7 are positioned to the non-driver side of the vehicle. In the right hand drive embodiment shown the guide arrangement pulley wheels 6, 7 are positioned in the upper and lower left hand corners of the windscreens. The 5 suction pads are positioned with this consideration and the adjustable clamps used to fine tune the positioning.

The winder unit 1 is secured to the underside of the windscreens to the opposite side of the windscreens, along the top edge with 10 the pulleys in side by side relationship such that one of the pulley wheels (pulley wheel 9) is positioned as far into the top corner as possible. This arrangement is shown in figure 5.

The cutting wire preferred for use is generally square in cross 15 section as is known for use in other modalities of windscreens removal. With the winder unit and guide arrangement in position as described, the cutting wire is looped around the outside of the windscreens to lie peripherally adjacent the bonding bead which is sandwiched between the glazing panel and 20 the support frame of the vehicle. Opposed ends of the cutting wire are fed through a pierced channel made through the bonding bead in the corner of the windscreens (x) below the position of the winder unit 1. A longer end length 40 of the wire is pulled through to the interior of the vehicle and passed around 25 the two pulley wheels 6, 7 of the guide arrangement and connected for winding to the winder spool 4 of the winder unit closest to the corner in which the winder unit is mounted. The shorter end length 41 of the wire is fed adjacent the inside of the windscreens and passed around the pulley wheel 9 of the 30 winder unit closest to the corner in which the winder unit is mounted before being connected for winding to the other winder spool 5 (the ends of the wire therefore cross in order to connect to the respective winder spools 4, 5 of the winder unit. The situation as described is shown in figure 6. This 35 concludes the set up phase of the technique.

The first phase in the cutting procedure is to wind the wire shorter end length 41 by winding in on the left hand winding spool 5; this causes the cut line to move upwardly through the bonding bead and around the upper corner of the windscreen 5 proximate to the winder unit, passing along a short portion of the upper edge of the windscreen. The shorter end length takes up sequential positions as shown by the dashed line in figure 7. At this point the ratchet is released and the spool is rewound a little until the wire becomes slightly slack. The 10 reason for this is described later in the procedure.

Operation of the other winder spool 4 of the winder unit 1 effects a cut along the bottom edge of the windscreen up the side of the windscreen proximate the guide arrangement and 15 along the top edge of the windscreen. The sequential interior wire length positions are shown in dashed line in figure 8. Initially, after the wire has come clear of the lower guide pulley wheel, the ratchet previously released from the first operated winder spool is reactivated. Continued operation of 20 the second winder spool 4 moves the cut line around the top corner of the windscreen and along the upper edge of the windscreen (from left to right as shown in the drawings) crossing over the shorter wire length portion above the winder unit to effect complete cut out of the windscreen.

25

As described above the ratchet of the first used winder spool 5 is released following the first, short length cut. This is because in the second cut stage in which the longer length wire is wound in and in which the cut line moves from right to left 30 along the lower edge of the windscreen in the drawings, the thicker excess bonding material that is likely to be encountered in this region of the windscreen will be tough to cut through, increasing the forces transmitted through the system. By deactivating the ratchet of the first winder spool 35 5, the wire will slip/slide at this point, feeding back off the

first spool to an extent resulting in a cutting slicing action that aids the cut effectiveness at this point. When the tougher cut has been accomplished, the wire will again follow the path of least resistance and resume cutting normally (and 5 the wire will stop back feeding off the first winder spool). This system tweak reduces the likelihood of the wire breaking due to excessive tension. The ratchet can then be reapplied. The point at which the ratchet should be reapplied and 10 deactivated typically comes down to operator skill, experience and judgement.

The present invention provides the benefits of wire cutting systems without over complex system apparatus arrangements or the need to re configure the apparatus significantly following 15 initial set up. The technique can be used by operators of relatively little experience or physical strength following an initial set up routine of minimal complexity.

Claims:

1. A method of cut out of a vehicle glazing panel bonded in a frame by means of interposed bonding material, the
5 method comprising:

setting a wire winder unit on the windscreens, the winder unit including a plurality of winder spools and at least one wire wrap around guide element positioned proximate a
10 corner of the glazing panel;

15 setting a wire guide arrangement on the windscreens spaced from the wire winder unit, the wire guide arrangement including respective wire wrap around guide elements positioned proximate respective corners of the glazing panel;

20 looping a cutting wire about the periphery of the glazing panel and inserting first and second ends of the wire through the bonding material;

winding the wire from opposed ends by means of the winder spools.

25 2. A method according to claim 1, wherein the set position of the wire winder unit and the wire guide arrangement relative to the glazing panel remains substantially fixed throughout the cut out procedure.

30 3. A method according to any preceding claim, wherein the winder spools are spaced and the opposed end portions of the cutting wire are wound around respective spools, such that a wire crossover portion is created adjacent the winder spools.

4. A method according to any preceding claim, wherein the wire winder unit and wire guide arrangement are set on the glazing panel internally of the vehicle, the cutting wire being looped around the periphery of the glazing panel externally of the vehicle.
5. A method according to any preceding claim, wherein one or more wrap around guide elements comprise rotatably mounted guide wheels.
- 10 6. A method according to any preceding claim, wherein the wire guide arrangement includes a mounting arrangement comprising one or more suction mounts.
- 15 7. A method according to any preceding claim, wherein the wire winder unit includes a mounting arrangement comprising one or more suction mounts.
- 20 8. A method according to any preceding claim, wherein, in set up, the cutting wire passes through the bonding material at a position proximate a corner of the glazing panel.
- 25 9. A method according to claim 9, wherein, in set up, the cutting wire passes through the bonding material at a position to the same side of the glazing panel as the wire winder unit.
10. A method according to claim 10, wherein, in set up, the cutting wire passes through the bonding material at a position substantially directly below the wire winder unit.
- 30 11. A method according to any preceding claim, wherein the wire wrap around guide elements of the guide arrangement are positioned to the same side of the glazing panel.

12. A method according to any preceding claim, wherein internally of the vehicle, at set up, a longer length of cutting wire extends around the wrap around guide elements of the guide arrangement and is wound on a first winding spool of the winder unit, a shorter length of cutting wire extending around a wrap around guide element of the winder unit and being wound on a second winder spool of the winder unit.

10. 13. A method according to claim 13, wherein with the spool connected to the shorter length of wire is first wound in to effect a first cut phase; the spool connected to the longer wire length being subsequently wound in.

15. 14. A method according to any preceding claim, wherein during the winding procedure a ratchet of one of the spools is release facilitating slackening or unwinding of a previously wound portion of the cutting wire.

20. 15. A guide arrangement for use in aiding performance of a cut out method according to any preceding claim, wherein the guide arrangement includes a mount and a pair of positioning limbs extending from the mount at an apex defined by the proximal ends of the limbs, each said limb carrying at its distal end a respective wrap around guide element for the cutting wire.

25. 16. A guide arrangement according to claim 16, wherein the wrap around guide elements comprise guide wheels rotatably mounted to the respective limbs.

30. 17. A guide arrangement according to claim 16 or claim 17, wherein the limbs are pivotally connected to the mount such that the angle between the limbs can be varied.

18. A guide according to any of claims 16 to 18, wherein the limbs are pivotally connected to the mount such that the limbs can pivot in two mutually perpendicular axes.

5 19. A guide arrangement according to claim 19, wherein the pivotal mount comprises a ball and socket type connection.

20. A guide arrangement according to any of claims 16 to 20, wherein the apex mount comprises a suction mount.

10 21. A guide arrangement according to any of claims 16 to 21, wherein one or both limbs is provided with a further mount intermediate the opposed ends of the limb.

15 22. A guide arrangement according to claim 22, wherein the further mount comprises a suction mount.

20 23. A guide arrangement according to claim 22 or claim 23, wherein the further mount is adjustable to be secured at various positions along the length of the limb.

25 24. A guide arrangement according to any of claims 22 to 24, wherein the further mount is adjustable with respect to its angular orientation about the longitudinal axis of the limb.

30 25. A guide arrangement according to any of claims 22 to 25, wherein the further mount is adjustable to the position of the mount below the limb.

26. A winder unit for use in aiding performance of a cut out method according to any of claims 1 to 15, the unit comprising:

35 mounting means for mounting the unit;

first and second winder spools for winding cutting wire;
and,

5 at least one wire wrap around guide element positioned
away from the mounting means.

27. A winder unit according to claim 27, wherein the wrap
around guide element comprises a guide wheel rotatably
mounted with respect to the unit.

10 28. A winder unit according to claim 27 or claim 28, wherein
the mounting means comprises one or more suction mounts.

15 29. Apparatus for use in cutting out a vehicle glazing panel
using cutting wire, the apparatus comprising:

a winder unit comprising:

20 mounting means for mounting the winder unit;

first and second winder spools for winding the
cutting wire; and,

25 at least one wire wrap around guide element
positioned away from the mounting means; and,

30 a guide arrangement including mounting means for mounting
the guide arrangement and a pair of positioning limbs
extending from the mount at an apex defined by the
proximal ends of the limbs, each said limb carrying at its
distal end a respective wrap around guide element for the
cutting wire.

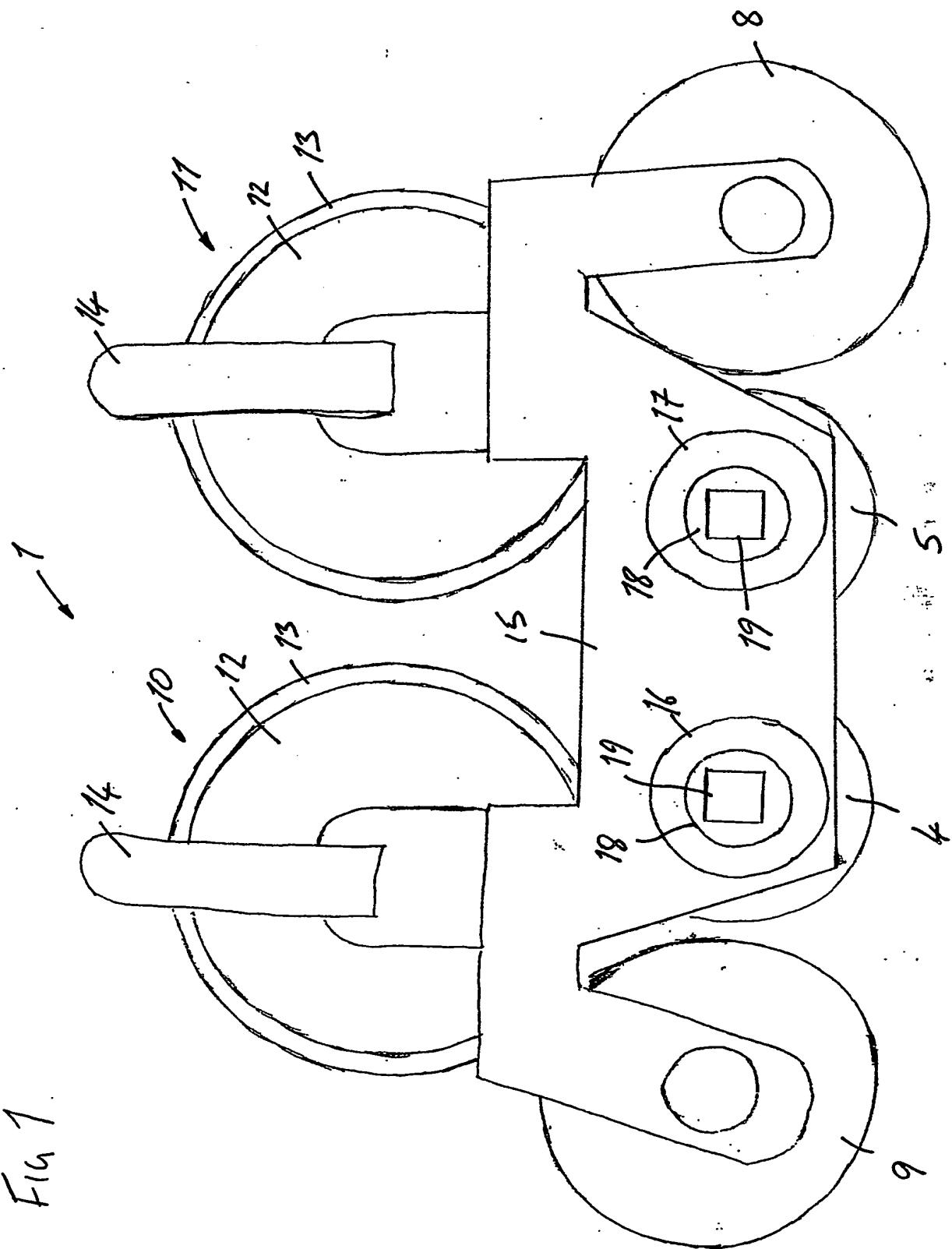


Fig 1.

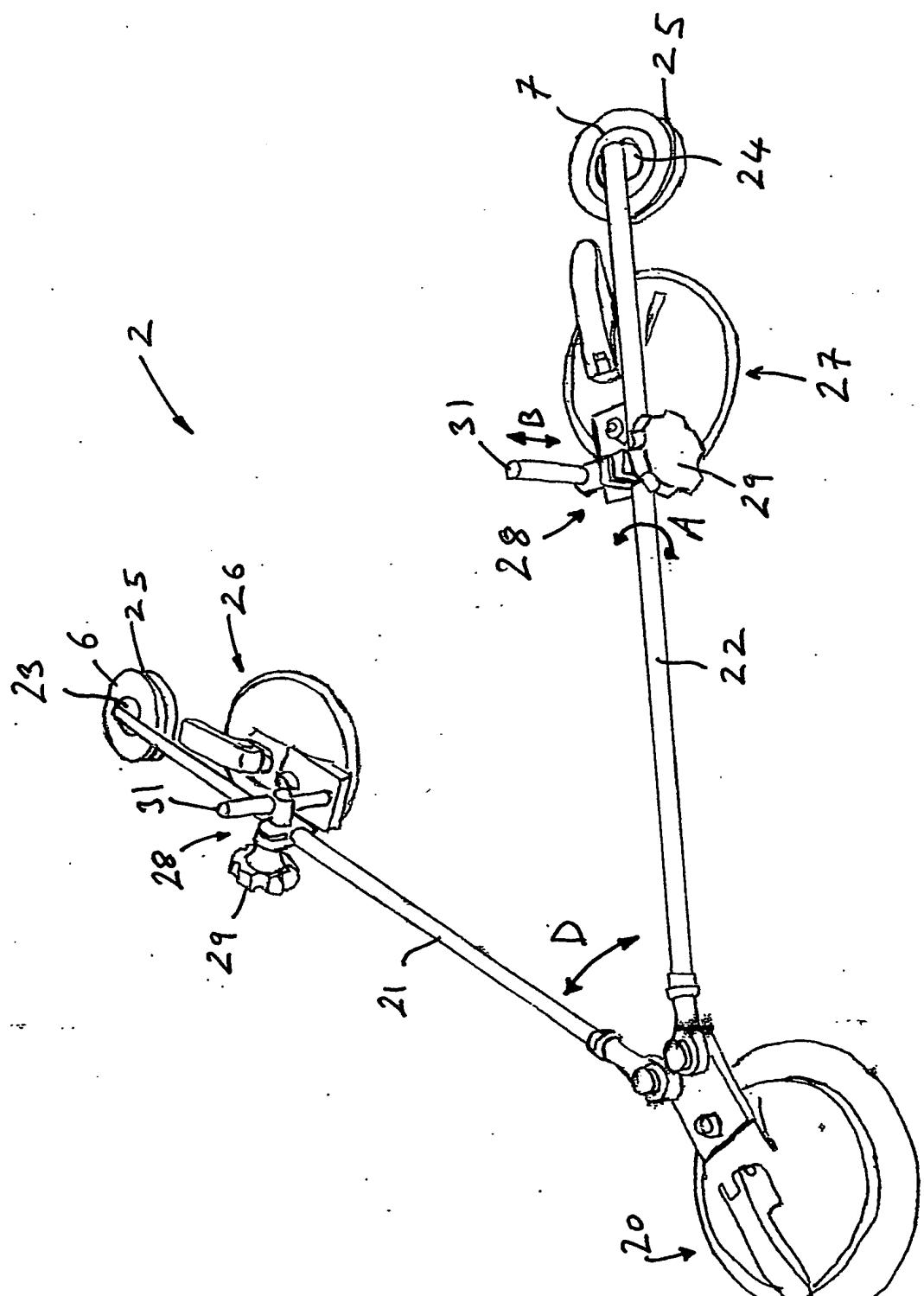


Fig 2

FIG 3A

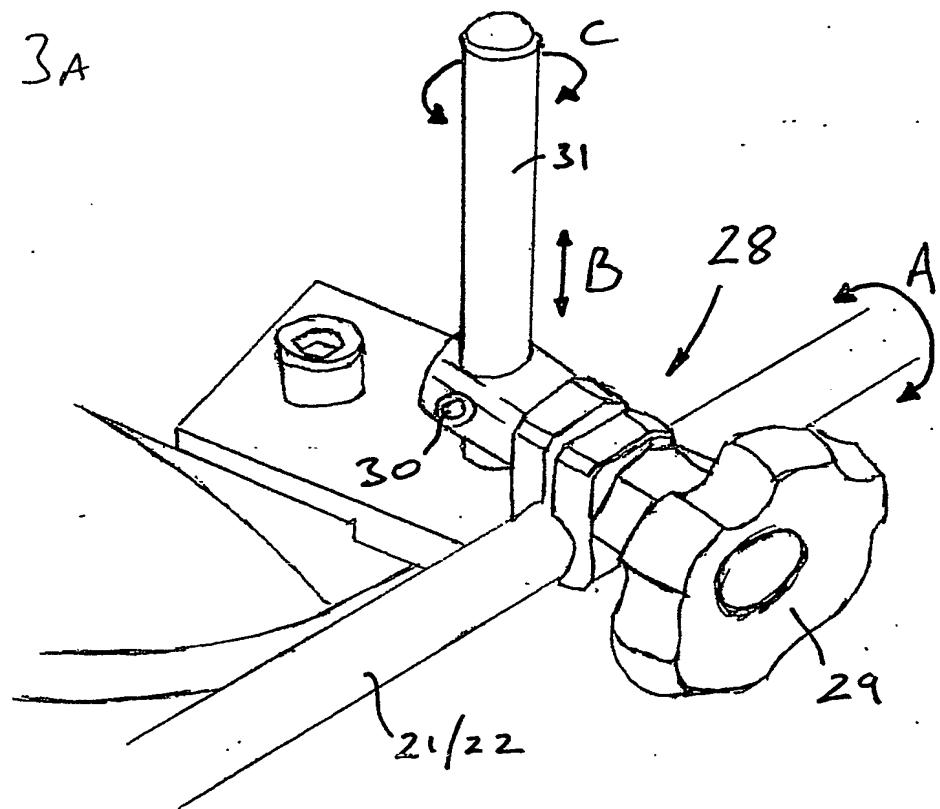


FIG 3B

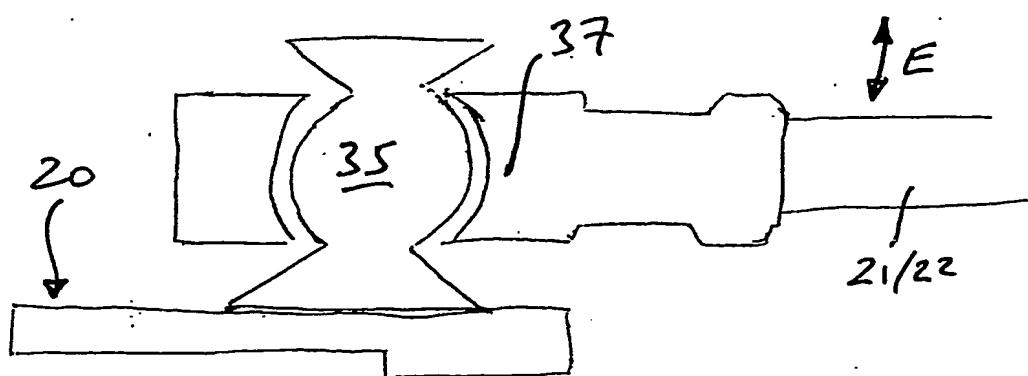


FIG 4

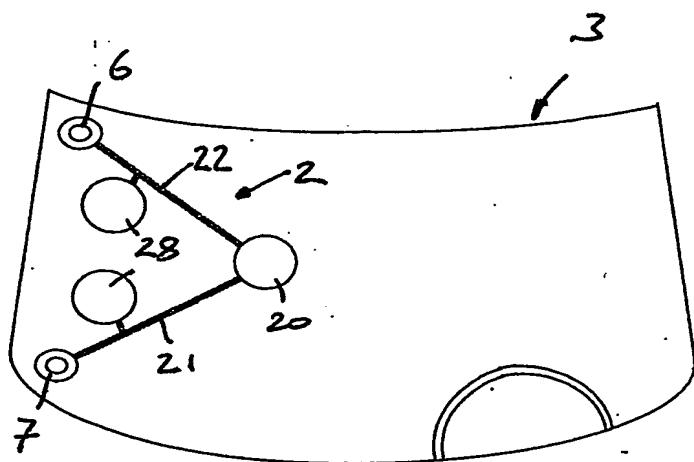


FIG 5

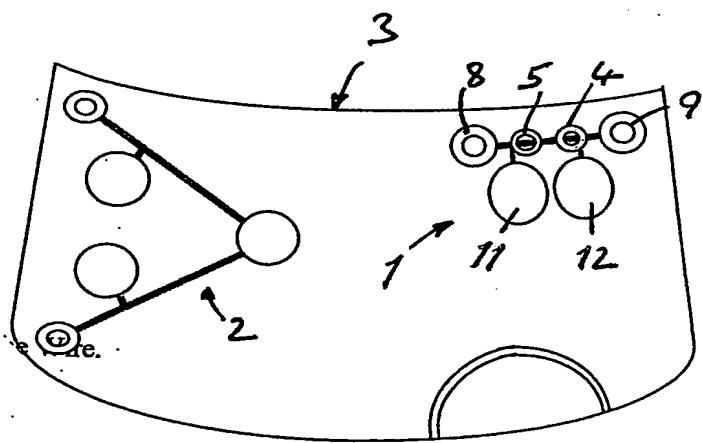


FIG 6

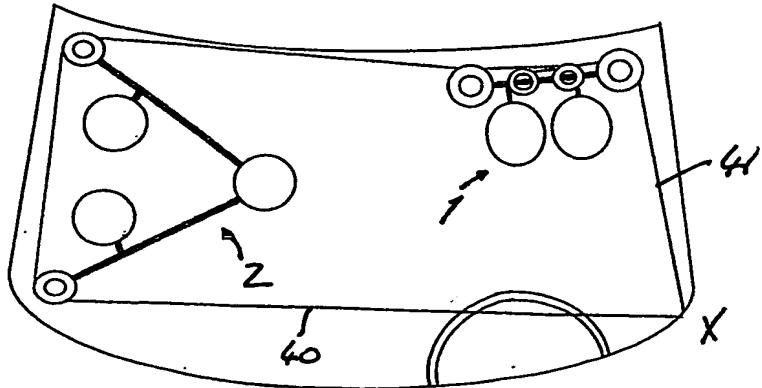


Fig 7

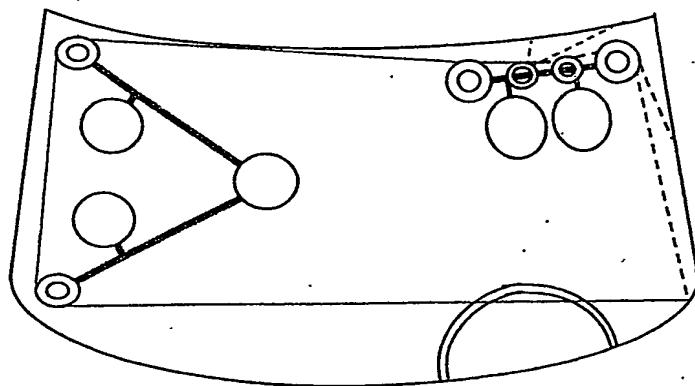
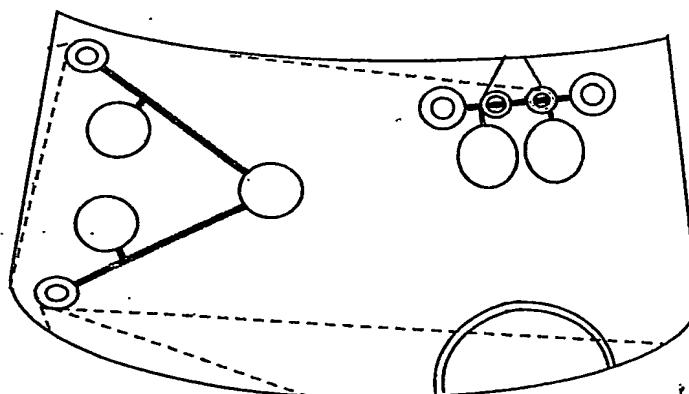


Fig 8



Document made available under the Patent Cooperation Treaty (PCT)

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Document type: Certified copy of priority document

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Number: 0420468.1
Filing date: 14 September 2004 (14.09.2004)

Date of receipt at the International Bureau: 27 October 2005 (27.10.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



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